



National Oceanic and Atmospheric Administration

Mission Statement

The National Oceanic and Atmospheric Administration's mission is to describe and predict changes in the Earth's environment, and conserve and manage wisely the Nation's coastal and marine resources so as to ensure sustainable economic opportunities.

NOAA conducts research to develop new technologies, improve operations, and supply the scientific basis for managing natural resources and solving environmental problems. NOAA's comprehensive system for acquiring observations - from satellites to radar to ships and submersibles - provides the quality data and information needed for the safe conduct of daily life and the efficient pursuit of the complex activities of modern society. Common products and services include weather and climate warnings and forecasts, environmental technologies, marine fisheries statistics and regulations, nautical charts, assessments of environmental changes, and hazardous materials response information. These capabilities, products, and services support the domestic security and global competitiveness of the United States, and they affect the lives of nearly every citizen today.

NOAA's FY 2001 budget request provides the resources to maintain essential services, facilitate progress in key investment areas of national interest, and address statutory obligations. This proposed budget ensures an appropriate balance among the environmental assessment, prediction, and stewardship needs of the Nation. For FY 2001, NOAA requests \$2.9 billion and approximately 12,600 FTE to manage natural resources and provide assessment and prediction of the Earth's environment. NOAA efforts are key components of the Department of Commerce strategic plan and will contribute significantly to achieving DOC's strategic goals.

The challenge of investing strategically in the Nation's future is accompanied by the requirement of effective agency management, to identify and realize opportunities for savings, and to focus on what matters to Americans. NOAA envisions a 21st century in which environmental stewardship, assessment, and prediction serve as keystones to enhancing economic prosperity and quality of life, better protection of lives and property, and strengthening of the U.S. balance of trade. This vision depends on NOAA actions that:

- Create and disseminate reliable assessments and predictions of weather, climate, space environment, ocean and living marine resources, nautical and geodetic phenomena and systems.
- Implement integrated approaches to environmental management and ocean and coastal resources development for economic and social health.
- Ensure continuous operational observing capabilities -- including buoys, satellites, ships, submersibles, and radars.
- Build and use new information networks, including investing in state-of-the-art computing capabilities.
- Develop public-private, interagency, and international partnerships for the expansion, transfer, and archiving of environmental knowledge.
- Invest in scientific research and the development of new technologies to improve current operations and prepare for the future.
- Improve NOAA's ability to serve its customers and forge stronger ties with its partners and stakeholders.

Priorities

Department-Wide

- *Natural Resources* - In support of this initiative, NOAA will work to reduce overfishing and overcapitalization of the Nation's fishery resources; better manage protected and threatened resources; protect coastal habitats from continued loss and degradation; conduct more research into the effects of climate changes on the oceans and atmosphere; and promote safe navigation.
- *Minority Serving Institutions* – NOAA contributes to the Department's priority to support Minority Serving Institutions (MSI) by proposing a \$17 million increase in FY2001 to build capacity at MSIs. This initiative cuts across all of NOAA's strategic goals, and helps train students in sciences that serve NOAA's mission.

Bureau

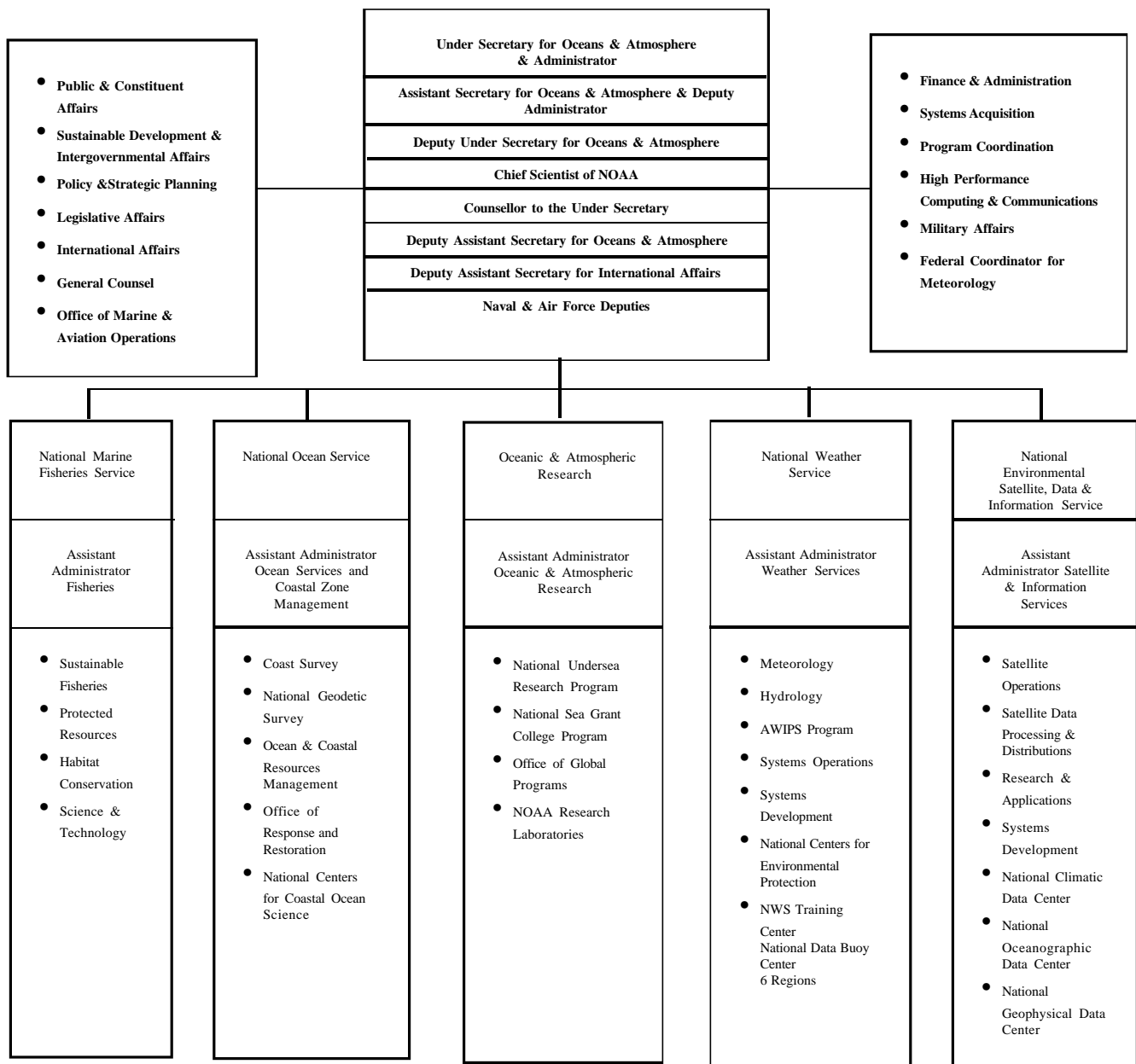
- *Natural Disaster Reduction Initiative* - NOAA contributes to this initiative by providing weather and climate warnings and forecasts to the general public. The National Weather Service acquires and processes hydrometeorological, ocean, and space-based observations, conducts weather and climate research, and maintains historical environmental data, and makes this information available to public and private concerns.
- *Lands Legacy* - The FY 2001 Budget provides resources to address the most serious challenges facing the Nation's coasts and oceans. This includes resources to enhance the twelve National Marine Sanctuaries which allows NOAA to fulfill its mission of marine resource protection and management. Also included are additional resources to maintain and protect our critical estuaries, as well as mapping and monitoring of fragile coral reefs. With additional funds in FY 2001, NOAA will also address the effects of polluted run-off in coastal areas, implement priority recommendations of the U.S. Coral Reef Task Force, enhance the recovery of threatened and endangered coastal salmon, and provide grants to coastal States involved in offshore oil and gas production. In addition, NOAA is a key player in the Administration's Clean Water and South Florida Ecosystem Restoration Initiatives.
- *Climate Observations and Services* – During recent years, there has been a growing demand from emergency managers, the private sector, the research community, decision-makers in the U.S. and international governmental agencies and the general public to provide timely data and information about climate variability, climate change and trends in extreme weather events. The economic and social need for continuous, reliable climate data and longer-range climate forecasts has been clearly demonstrated. This initiative will support transitioning our current research efforts and knowledge into operational systems and products. To do this, NOAA will focus its efforts to address key deficiencies in its observation and data management systems, implement new ocean observations, and develop a broad spectrum of new forecast products.
- *America's Ocean Future Initiative* - To implement the 1999 interagency report "Turning to the Sea: America's Ocean Future" NOAA's FY 2001 Budget Request continues to focus on necessary actions designed to explore, protect, and restore America's vital ocean resources. Highlighting the important role the ocean plays in the daily lives of all Americans, the Administration introduced measures to promote new scientific insight into the oceans, sustain use of fisheries and other marine resources, provide new opportunities for economic growth, and protect fragile coastal communities and ecosystems, such as coral reefs, from damage and environmental degradation.

NOAA Specific Management Challenges

For FY 1999 an IPA firm has reported that preliminary analysis indicates an unqualified opinion on all financial statements, no material weaknesses, four reportable conditions, and five management letter comments.

NOAA's progress indicates a commitment to preparing high-quality, reliable, and meaningful financial statements. Remaining fiscal internal controls and the production of recurring financial reports and statements can only be addressed with the replacement of NOAA's current financial system. To this end, NOAA is proceeding with the implementation of the Commerce Administrative Management System (CAMS).

Organizational Structure



Targets and Performance Summary

Highlights of NOAA's FY 2001 Performance Plan

To fulfill its mission, NOAA continues to develop new technologies, improve operations, and supply the scientific basis for managing natural resources and solving environmental problems. The FY 2001 request supports NOAA's role by providing resources to maintain essential service, facilitate progress in key investment areas of national interest, and address statutory obligations. This request ensures an appropriate balance among the environmental assessment, prediction and stewardship needs of the Nation.

| Performance Goal 1: Advance Short-Term Warning and Forecast Services | | | |
|---|------------------------|------------------------|------------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Increase lead time (minutes) and accuracy (%) for severe weather warnings for Tornadoes | 12 min 70% accuracy | 12 min 70% accuracy | 13 min 70% accuracy |
| Decrease false alarm rate (FAR) (%) for severe weather warnings for Tornadoes | 72% FAR | 65% FAR | 59% FAR |
| Increase lead time (minutes) and accuracy (%) for severe weather warnings for Flash Floods | 41 min 83% accuracy | 55 min 86% accuracy | 57 min 86% accuracy |
| Increase lead time (hours) of warnings for Hurricanes | 23 hours | 20 hours | 21 hours |
| Increase accuracy (%) of 3-day forecast of precipitation | N/A | 20% | 22% |
| Increase lead time (hours) and accuracy (%) of warnings for Winter Storms | 11 hours 85% | 12 hours 85% | 13 hours 86% |
| Increase accuracy (%) and decrease false alarm rate (%) of forecasts of ceiling and visibility (Aviation Forecasts) | 19% 52% | 20% 50% | 21% 46% |
| Increase accuracy (%) of forecast for winds and waves (Marine Forecasts) | 50% | 51% | 53% |

| Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| ENSO Forecasts - Accuracy (correlation) | .85 | .85 | .85 |
| U.S. temperature - skill score | 24 | 20 | 20 |
| New and improved data sets developed and produced (cumulative per year) | 6 | 6 | 6 |
| Global Ocean-Atmosphere-Land System (GOALS) experiments implemented (%) | 20% | 25% | 25% |

Targets and Performance Summary

| Performance Goal 3: Predict and Assess Decadal to Centennial Change | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Document the "turnover" of CFC source gases in order to verify the effectiveness of global policy action | 1 | N/A | N/A |
| Publish updated trend results of air quality measurements | 1 | N/A | 1 |
| Lead development of a peer reviewed initial assessment of regional ozone in North America, including summarizing results for customers | 1 | N/A | N/A |
| Results of 90% of the research activities cited in the 2001 IPCC third Assessment of Climate Change | N/A | N/A | 90% cited |

| Performance Goal 4: Promote Safe Navigation | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Percent critical area survey backlog reduced (43,000 SNM backlog) cumulative reduction | 20.7% | 24.3% | 27.8% |
| Percent of National Spatial Reference System (cumulative complete) | 59% | 64% | 72% |

| Performance Goal 5: Build Sustainable Fisheries | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Percent of fish stocks assessed of 201 identified | 79% | N/A | N/A |
| Number of Fishery Management Plans with controlled access implemented | 27 | N/A | N/A |
| By 2005, 25% fewer overfished fisheries (currently 86 of 279 stocks are overfished.) | N/A | -8% | 1% |
| By 2005, 60% of stocks have sufficient essential fish habitat | N/A | 10% | 40% |
| By 2005, 9% increase in employment in non-capture fishing and other sectors in fishing communities | N/A | 1% | 3% |
| By 2005, 17% increase in economic contribution of aquaculture to Gross Domestic Product (GDP) | N/A | 2% | 4% |

Targets and Performance Summary

| Performance Goal 6: Recover Protected Species | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Number of recovery plans/conservation plans developed | 24 | 27 | N/A |
| Number of species with population status improved | 15 | 16 | N/A |
| Number of annual investigations of mortality of protected species | 10 | 15 | N/A |
| BY 2005, reduce the probability of extinction of 5 threatened species/ESUs out of 23 threatened species/ESUs (cumulative) | N/A | N/A | 0 |
| BY FY 2005 mortality of strategic marine mammal stocks incidental to commercial fishing operations in six fisheries will be at insignificant levels (annual) | N/A | N/A | 6 |
| BY 2005, reduce the probability of extinction of 8 endangered species/Endangered Species Units (ESUs) (cumulative) | N/A | N/A | 0 |

| Performance Goal 7: Sustain Healthy Coasts | | | |
|--|---------------------|---------------------|---------------------|
| Measure | FY 99 Actual | FY 00 Target | FY 01 Target |
| Number acres of coastal habitat restored (cumulative) | 43,000 | 55,000 | 70,000 |
| Number of U.S. coastal regions with reduced introductions and impacts of non-indigenous species (total of 6 regions) | 0 | 1 | 2 |
| Percent of U.S. shoreline and inland areas with improved ability to identify extent and severity of coastal hazards | 5% | 14% | 18% |

Resource Requirements Summary

Total Dollars: \$2.9 Billion

| Performance Goal | FY 99 Actual | FY 00 Enacted | FY 01 Request |
|---|--------------|---------------|---------------|
| Advance Short-Term Warning and Forecast Services | \$1,351.0M | \$1,261.0M | \$1,364.5M |
| Implement Seasonal to Interannual Climate Forecasts | \$105.4M | \$121.2M | \$129.5M |
| Predict and Assess Decadal to Centennial Change | \$117.1M | \$95.4M | \$114.2M |
| Promote Safe Navigation | \$155.5M | \$104.6M | \$109.5M |
| Build Sustainable Fisheries | \$684.0M | \$441.6M | \$435.4M |
| Recover Protected Species | \$85.4M | \$154.6M | \$278.3M |
| Sustain Healthy Coasts | \$270.1M | \$274.6M | \$483.6M |

Total FTEs: 12,600

Skill Summary: Meteorologists, Hydrologists, Engineers, Oceanographers, Physical Scientists, Atmospheric Scientists, Computer Specialists, Chemists, Physicists, Mathematicians, Cartographers, Fishery Biologists, Fishery Economists, Ecologists, Marine Ecologists, Toxicologists

| Performance Goal | FY 99 Actual | FY 00 Enacted | FY 01 Request |
|---|--------------|---------------|---------------|
| Advance Short-Term Warning and Forecast Services | 6,351 | 6,145 | 6,178 |
| Implement Seasonal to Interannual Climate Forecasts | 549 | 561 | 563 |
| Predict and Assess Decadal to Centennial Change | 485 | 486 | 508 |
| Promote Safe Navigation | 878 | 878 | 868 |
| Build Sustainable Fisheries | 2,330 | 2,460 | 2,479 |
| Recover Protected Species | 575 | 682 | 712 |
| Sustain Healthy Coasts | 890 | 867 | 912 |

Resource Requirements Summary (cont.)

Total IT Dollars: 277.0 Million

IT Requirements: Advanced Weather Interactive Processing System (AWIPS), Next Generation Weather Radar (NEXRAD) System, Geostationary Operational Environmental Satellites (GOES) Ground System, Geophysical Fluid Dynamics Laboratory (GFDL), National Marine Fisheries Service Fishing Information Technology System, Climate Prediction Center Climate Computer

| Performance Goal | FY 99 Actual | FY 00 Enacted | FY 01 Request |
|---|--------------|---------------|---------------|
| Advance Short-Term Warning and Forecast Services | \$161.0M | \$182.8M | \$107.0M |
| Implement Seasonal to Interannual Climate Forecasts | \$20.4M | \$16.7M | \$27.8M |
| Predict and Assess Decadal to Centennial Change | \$9.6M | \$5.0M | \$7.3M |
| Promote Safe Navigation | \$3.9M | \$3.2M | \$3.7M |
| Build Sustainable Fisheries | \$24.5M | \$24.0M | \$33.0M |
| Recover Protected Species | \$24.5M | \$24.0M | \$33.0M |
| Sustain Healthy Coasts | N/A | N/A | N/A |

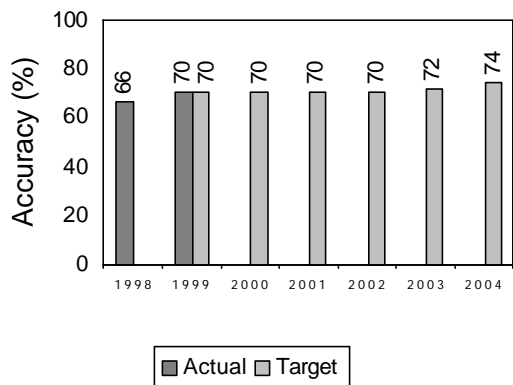
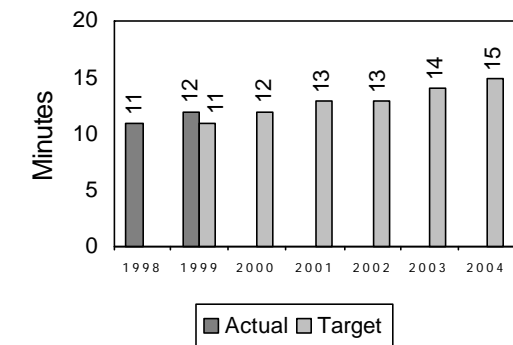
Performance Goal 1: Advance Short-Term Warnings and Forecasts

Rationale for Performance Goal

The environment has profound effects on human welfare and economic well-being. Significantly improved short-term warning and forecast products and services enhance public safety, through the protection of life and property, and the economic productivity of the Nation. They also enhance NOAA's ability to observe, understand, and model the environment, and effectively disseminate products and services to users.

Measure 1.a:

Increase lead time (minutes) and accuracy (%) for severe weather warnings for Tornadoes



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Monthly

Data storage: National Weather Service Headquarters (NWSH), Office of Meteorology (OM), Silver Spring, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of warnings from every NWS office across the Nation. Warnings are received real-time and stored as files on an Office of Systems Operations (OSO) server at NWSH. OM accesses the OSO server to retrieve the warnings and parse the data into a relational database. OM transmits weekly reports of the warning information to each NWS office where they are quality controlled for correctness. Each NWS office transmits to OM monthly reports of severe weather events using a computer application program designed specifically for that purpose. The severe weather event program includes extensive quality control checks to ensure the highest possible reliability of each report. The data in each report is parsed into the relational data base that also contains the severe weather warnings. The warnings and events are matched and appropriate statistics are calculated and made available to all echelons of the NWS.

Data limitations: There are limitations of scientific verification in assessing data. The fundamental purpose of scientific verification is to objectively assess program performance through the use of standard statistical analysis. However, a number of factors unique to the atmospheric sciences must be considered to ensure proper interpretation of objectively derived statistics. The primary factor to consider is the natural variation of this performance measure related to annual fluctuations in meteorological conditions associated with severe weather. Outyear measures are dependent on a stable funding profile and take into account improved use of the Weather Surveillance Radar (WSR-88D), new satellites, improved forecast models, new and continued U.S. Weather Research Program (USWRP) research activities, investments in critical observing systems, and continued support of the Advanced Weather Interactive Processing System (AWIPS).

Actions to be taken: Data collection and verification will continue and false alarm rates will be reported in future years. Forecaster accessibility to this data will be enhanced.

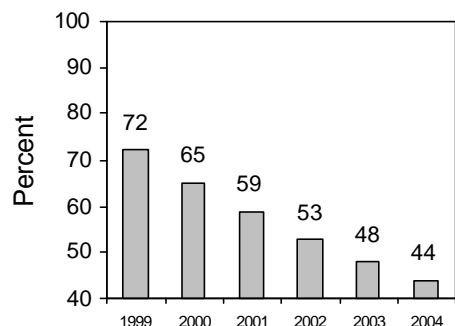
Explanation

The lead time for a tornado warning is the difference between the time the warning was issued and the time the tornado affected the area for which the warning was issued. The lead times for all tornado occurrences throughout the year are averaged to get this statistic. The accuracy of the warnings is the percentage of times a tornado actually occurred in an area that was already covered by a warning.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.b:

Decrease false alarm rate (FAR) (%) for severe weather warnings for Tornadoes



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Monthly

Data storage: National Weather Service Headquarters (NWSH), Office of Meteorology (OM), Silver Spring, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of warnings from every NWS office across the Nation. Warnings are received real-time and stored as files on an Office of Systems Operations (OSO) server at NWSH. OM accesses the OSO server to retrieve the warnings and parse the data into a relational database. OM transmits weekly reports of the warning information to each NWS office where they are quality controlled for correctness. Each NWS office transmits to OM monthly reports of severe weather events using a computer application program designed specifically for that purpose. The severe weather event program includes extensive quality control checks to ensure the highest possible reliability of each report. The data in each report is parsed into the relational data base that also contains the severe weather warnings. The warnings and events are matched and appropriate statistics are calculated and made available to all echelons of the NWS.

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Actions to be taken: Data collection and verification will continue and false alarm rates will be reported in future years. Forecaster accessibility to this data will be enhanced.

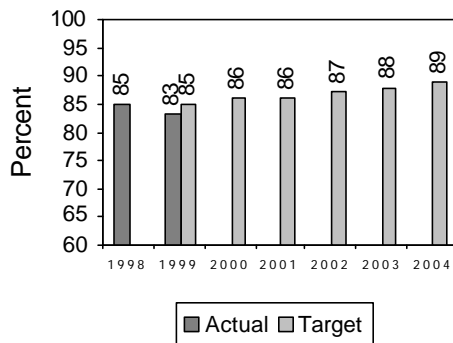
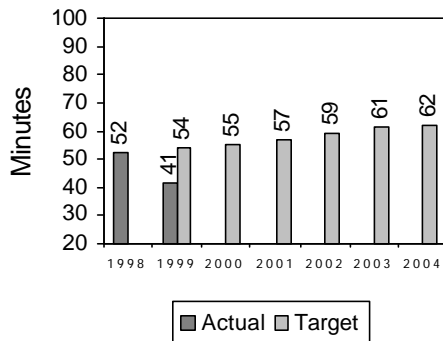
Explanation

The false alarm rate is the percentage of all warnings that are incorrect, such as a tornado warning that was issued for a particular area, but a tornado did not occur.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.c:

Increase lead time (minutes) and accuracy (%) for severe weather warnings for Flash Floods



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Monthly

Data storage: National Weather Service Headquarters (NWSH), Office of Meteorology (OM), Silver Spring, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of warnings from every NWS office across the Nation. Warnings are received real-time and stored as files on an Office of Systems Operations (OSO) server at NWSH. OM accesses the OSO server to retrieve the warnings and parse the data into a relational database. OM transmits weekly reports of the warning information to each NWS office where they are quality controlled for correctness. Each NWS office transmits to OM monthly reports of severe weather events using a computer application program designed specifically for that purpose. The severe weather event program includes extensive quality control checks to ensure the highest possible reliability of each report. The data in each report is parsed into the relational data base that also contains the severe weather warnings. The warnings and events are matched and appropriate statistics are calculated and made available to all echelons of the NWS.

Data limitations: There are limitations of scientific verification in assessing data. The fundamental purpose of scientific verification is to objectively assess program performance through the use of standard statistical analysis. However, a number of factors unique to the atmospheric sciences must be considered to ensure proper interpretation of objectively derived statistics. The primary factor to consider is the natural variation of this performance measure related to annual fluctuations in meteorological conditions associated with severe weather. Outyear measures are dependent on a stable funding profile and take into account improved use of the Weather Surveillance Radar (WSR-88D), new satellites, improved forecast models, new and continued U.S. Weather Research Program (USWRP) research activities, investments in critical observing systems, and continued support of the Advanced Weather Interactive Processing System (AWIPS).

Actions to be taken: Data collection and verification will continue and new performance measures will be reported in future years. Forecaster accessibility to this data will be enhanced.

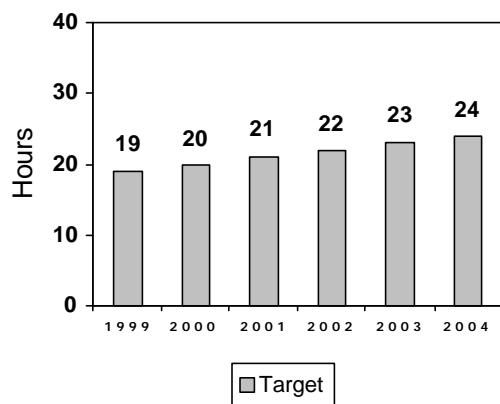
Explanation

The lead time for a flash flood warning is the difference between the time the warning was issued and the time the flash flood affected the area for which the warning was issued. The lead times for all flash flood occurrences throughout the year are averaged to get this statistic. The accuracy of the warnings is the percentage of times a flash flood actually occurred in an area that was already covered by a warning.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.d:

Increase lead time (hours) of warnings for Hurricanes



Data Validation and Verification:

Data collection: National Hurricane Center (NHC)

Frequency: Annual

Data storage: NHC/Tropical Prediction Center, Miami, FL

Verification: Hurricane storm verification is performed for hurricanes, tropical storms, and tropical depressions and considered whether over land or water. The NHC issues warning when hurricane conditions are expected along the coast within 24 hours. The location and timing of these warnings are based upon a number of factors, including the official NHC track forecast. The average lead times for hurricane warnings in the Atlantic basin are calculated at the end of each hurricane season.

Data limitations: There is large variability in the hurricane warning program due to sample sizes and types of storms each year. There may be years with unusually easy or difficult forecasts. Outyear measures are dependent on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and continued support of AWIPS.

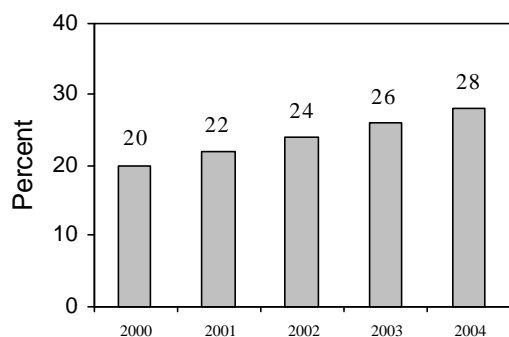
Actions to be taken: Data collection and verification will continue and accuracy of lead time will be reported.

Explanation

A hurricane warning is issued when hurricane force winds are predicted to affect a portion of the U.S. coastline. The lead time is critical for the evacuation of vulnerable areas

Measure 1.e:

Increase accuracy (%) of 3-day forecast of precipitation



Data Validation and Verification:

Data collection: Hydrometeorological Prediction Center (HPC)

Frequency: Annual

Data storage: World Weather Building, Camp Springs, MD

Verification: HPC has produced the Quantitative Precipitation Forecast (QPF) since the early 1960s and has kept verification statistics related to the QPF program since that time. All data is examined for accuracy and quality control procedures are applied.

Data limitations: The NWS routinely prepares and distributes to internal and external customers predictions of heavy rainfall. The HPC has the responsibility to prepare both graphical and text products depicting the areas threatened by heavy precipitation in the contiguous United States. There will be a significant amount of variability and the improvements may not be achieved exactly as predicted. Outyear measures are dependent on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and continued support of AWIPS.

Actions to be taken: Data collection and verification will continue. Forecaster accessibility to this data will be enhanced.

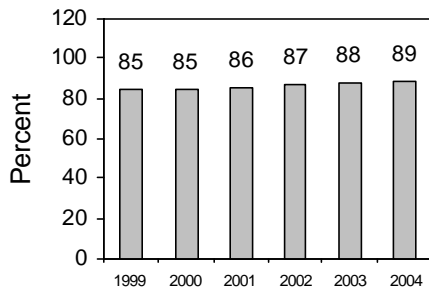
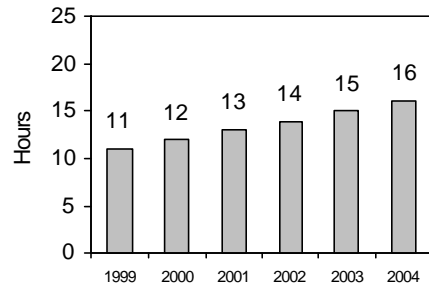
Explanation

The accuracy of a forecast of precipitation issued 3 days in advance.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.f:

Increase lead time (hours) and accuracy (%) of warnings for Winter Storms



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Daily

Data storage: National Weather Service Headquarters (NWSH), Office of Meteorology, Silver Spring, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of forecasts and observational from each NWS office across the Nation. The quality controlled, collated data are transmitted to the National Centers for Environmental Prediction in Camp Springs, MD where it is stored as computer files. The data files are retrieved by the NWSH, Office of System Development (OSD). Following additional quality control the data are stored on an OSD workstation and used to generate semi-annual statistics on forecast accuracy.

Data Limitations: Documentation for heavy snowfall is printed annually. Due to the relatively few number of cases each year, the projections assume a 3-year average (current plus 2 previous years equally weighted). Due to the large volume of data gathered and computed, a document for the above cannot be finalized until well into the following fiscal year. Outyear measures are dependent on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and continued support of AWIPS.

Actions to be taken: Data collection and verification will continue. Forecaster accessibility to this data will be enhanced.

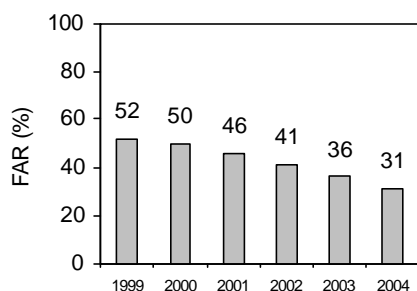
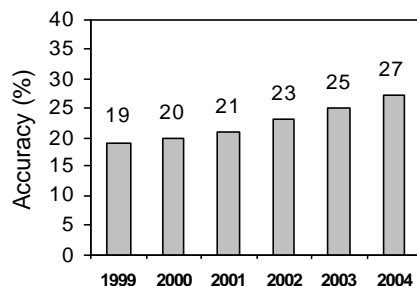
Explanation

A winter storm warning is issued when 4 or more inches of snow or sleet is expected in the next 12 hours, or 6 or more inches in 24 hours, or 1/4 inch or more of ice accretion is expected.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.g:

Increase accuracy (%) and decrease false alarm rate (%) of forecasts of ceiling and visibility (Aviation Forecasts)



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Daily

Data storage: National Weather Service Headquarters (NWSH), Office of Meteorology, Silver Spring, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of forecasts and observational from each NWS office across the Nation. The quality controlled, collated data are transmitted to the National Centers for Environmental Prediction in Camp Springs, MD where it is stored as computer files. The data files are retrieved by the NWSH, Office of System Development (OSD). Following additional quality control the data are stored on an OSD workstation and used to generate semi-annual statistics on forecast accuracy.

Data limitations: Documentation for temperature verification is printed annually. Due to the large volume of data gathered and computed, documentation for the above cannot be finalized until well into the following fiscal year. Outyear measures are dependent on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and implementation of AWIPS.

Actions to be taken: Data collection and verification will continue. Forecaster accessibility to this data will be enhanced.

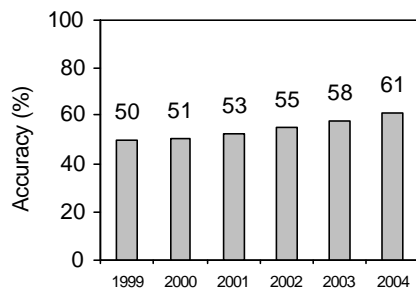
Explanation

Visibility and cloud ceiling forecasts are critical for aircraft operations.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Measure 1.h:

Increase accuracy (%) of forecast for winds and waves (Marine Forecasts)



Data Validation and Verification:

Data collection: National Weather Service (NWS) Field Offices

Frequency: Daily

Data storage: National Weather Service, National Centers for Environmental Prediction (NCEP), Ocean Modeling Branch (OMB), Camp Springs, MD

Verification: Verification is the process of comparing the predicted weather to the actual event. The process begins with the collection of forecasts and observational from each NWS office across the Nation. The quality controlled, collated data are transmitted to the National Centers for Environmental Prediction in Camp Springs, MD where it is stored as computer files. The data files are retrieved by the NWS, NCEP, OMB. Following additional quality control the data used to generate quarterly statistics on forecast accuracy.

Data Limitations: Documentation for temperature verification is printed annually. Due to the large volume of data gathered and computed, documentation for the above cannot be finalized until well into the following fiscal year. Outyear measures are dependent on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and implementation of AWIPS.

Actions to be taken: Current data collection and verification will continue and national data collection and verification will be added for forecasts for the Great Lakes. Forecaster accessibility to this data will be enhanced.

Explanation

Wind speeds and waves heights are critical for the safe operations of ships and boats.

Program Evaluation Efforts

- Program evaluations at NWS field offices are conducted annually.
- Quality control procedures are also followed to ensure the highest possible reliability of gathered data and weather products.
- The National Academy of Sciences is also involved in program analysis and evaluation processes on a national level.

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Strategies and Activities

| Strategies | Activities | Budget Request |
|---|---|----------------|
| Sustain modernized weather service operations. | Increase understanding of the environment through research and investments in new technologies to provide to provide more accurate and timely weather warnings and forecasts required by the Nation. | \$743.2M |
| Maintain continuous operational satellite coverage critical for warnings and forecasts. | Position satellites over the United States to provide uniform coverage with visible and infrared (day and night) imagery. Combine satellite coverage with data from other systems to form a complete set of information about the space from the Earth's surface to the upper atmosphere. | \$500.8M |
| Strengthen observing and prediction systems. | Improve observing systems, develop better understanding of natural processes, and enhance predictive models and dissemination systems through scientific, technological and programmatic advances, and international cooperation. | \$62.0M |
| Improve customer service to the public, emergency managers, the media, and private forecasters. | Utilize telecommunications systems to ensure effective dissemination to the users of weather forecasts, warnings, and other products. Expand external outreach activities to ensure customers can effectively use NOAA's products. | \$13.6M |

Resource Requirements

Total Dollars: \$1.4 billion

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$1,350,923 | \$1,261,027 | \$1,364,520 |

Total FTE: 6,178

Skill Summary: Meteorologists, Hydrologists, Electronic Technicians, Hydrometeorological Technicians, Engineers, Oceanographers

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 6351 | 6145 | 6178 |

Performance Goal 1: Advance Short-Term Warnings and Forecasts

Resource Requirements

Total IT Dollars: 107.2 million

IT Requirements: Advanced Weather Interactive Processing System:, Next Generation Weather Radar (NEXRAD) System, Geostationary Operational Environmental Satellites (GOES) Ground System, Automated Surface Observing System (ASOS).

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$160.9M | \$182.9M | \$107.2M |

Cross-Cutting Issues

Intra-DOC

NOAA works closely with *NIST* and *EDA*, and other agencies such as FEMA, the Corps of Engineers, the Bureau of Reclamation, and others as well as State and local governments to participate in the Federal Natural Disaster Reduction initiative which is focused on reducing the costs of natural disasters and saving lives through improved warnings and forecasts and the provision of information to improve resiliency to disaster.

Other Government Agencies

Weather and climate services are provided to the public and industry through a unique partnership between NOAA and the private meteorological sector. NOAA provides forecasts and warnings for public safety, and the private sector promotes dissemination of forecasts and the tailoring of basic information for business uses.

NOAA works very closely with DoD, especially the Air Force, to complement DoD meteorological services in the interest of national security. NOAA works closely with the U.S. Coast Guard for the dissemination of marine weather warnings and forecasts. NOAA also works directly with FAA on aviation forecasts and with NASA on launch forecasts and solar forecast effects.

External Factors and Mitigation Strategies

A number of factors unique to the atmospheric sciences must be considered when reviewing the performance measures for this goal. The primary factor to consider is the natural variation of this goal related to annual fluctuations in meteorological conditions associated with severe weather. Another factor is that damage to critical equipment (e.g. supercomputer fire, satellite outage) can impact daily operations for extended periods, even though numerous safety measures and back-up procedures are in place.

Although the performance measure under this goal may improve, the impact on society may not be obvious due to factors beyond our control. For example, the hurricane warnings may become more accurate, but because of the increase in population along the coastlines, the deaths, injuries, and/or damage estimates may increase.

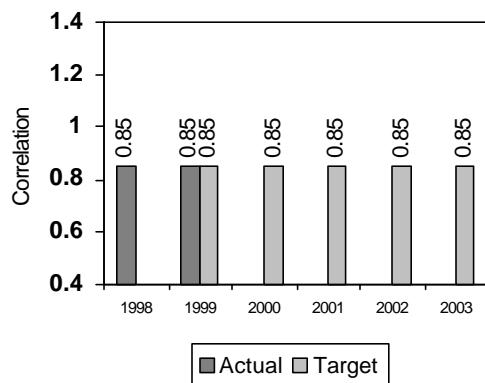
Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts

Rationale for Performance Goal

NOAA works with academic and international partners to provide one-year lead-time forecasts of global climate variability, especially El Niño, and consequent precipitation and surface temperature distributions. These forecasts increase society's ability to mitigate economic losses and social disruption from such events.

Measure 2.a:

ENSO (El Niño/Southern Oscillation) Forecasts - Accuracy (correlation)



Data Validation and Verification:

Data collection: Forecasts of sea surface temperature in a portion of the Pacific Ocean, and observations from buoys, ships, and satellites.

Frequency: Annual

Data storage: National Weather Service's National Centers for Environmental Prediction, Camp Springs, MD

Verification: NOAA quality controls the incoming data (e.g., error checking, interstation comparison), and the satellite data can be compared with the in situ data to help validate the data accuracy.

Data limitations: This measure assesses the correlation between forecasts of sea surface temperature (based on models) and actual sea surface temperature (based on satellite and in situ observations). Improvements in forecasting ability depend upon improved observations, models, and research. Forecasts will likely be better in El Niño years than in non-El Niño years.

Actions to be taken: Efforts will be undertaken to determine the limits in predictability of the atmosphere induced by tropical Pacific sea surface temperature changes, to diagnose and model the global response to warm, cold and neutral states of the ENSO cycle, and to examine the changes in probabilities of extreme events induced by ENSO.

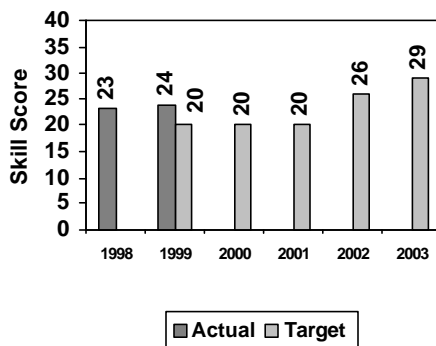
Explanation

The 1997-1998 El Niño was the best monitored and most successfully predicted El Niño on record. NOAA provided advance forecast of El Niño impacts, leading to great savings to a variety of economic sectors. ENSO forecasts require a variety of data, such as ocean observations, remote satellite-based observations, and terrestrial measurements. This program is the only U.S. Federal effort aimed at providing forecasts of climate events and their consequent impacts

Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts

Measure 2.b:

U. S. temperature - skill score



Data Validation and Verification:

Data collection: Forecast data, observations from U.S. Weather Forecast Offices (WFO) and from a cooperative network maintained by volunteers across the Nation..

Frequency: Annual

Data storage: National Weather Service's National Centers for Environmental Prediction, Camp Springs, MD

Verification: NOAA performs quality assurance analysis of the data (e.g., error checking, elimination of duplicates, interstation comparison) both at the national and WFO level.

Data limitations: For those areas of the United States where a temperature forecast (i.e., warmer than normal, cooler than normal, normal) is made, this score measures how much better the prediction is than the random chance of being correct. Skill score is based on a scale of -50 to +100. If forecasters match what would be predicted by random chance, the skill score is 0. Anything above 0 shows positive skill in forecasting. Given the difficulty of making advance temperature and precipitation forecasts for specific locations, a skill score of 20 is considered quite good and means the forecast was correct in almost 50 percent of the locations forecasted. Forecasts will likely be better in El Niño years than in non-El Niño years.

Actions to be taken: Temperatures across the U.S. will be measured using NOAA's cooperative network maintained by volunteers across the Nation. Temperature data will be collected and analyzed by NOAA.

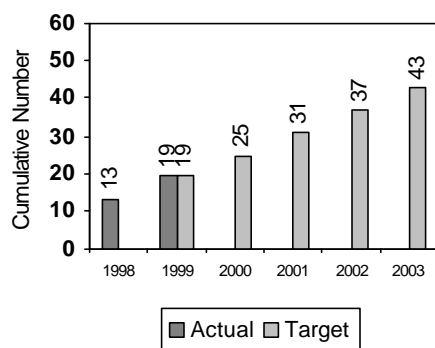
Explanation

Accurate measures of temperature are critical to many sectors of the national economy, including agriculture and energy utilities. This measure compares actual observed temperatures with those forecasted from areas all across the country.

Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts

Measure 2.c:

New and improved data sets developed and produced (cumulative per year)

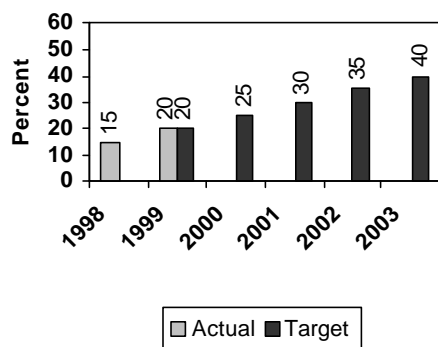


Explanation

NOAA collects *in situ* as well as satellite data over the oceans and land. The data are quality controlled and archived by NOAA. The data sets are used to calibrate, initialize, and verify forecasting models run by computers. In addition, these databases are valuable in that they help in monitoring the current climate, as well as in better understanding historical climate variability.

Measure 2.d:

Global Ocean-Atmosphere-Land System (GOALS) experiments implemented (%)



Explanation

The Global Ocean-Atmosphere-Land System (GOALS) program builds upon the successful El Niño research of the recently completed Tropical Ocean-Global Atmosphere (TOGA) program. While TOGA made possible our ability to forecast El Niño up to a year in advance with useful skill, the forecasts are limited in that they focus on the evolution of the tropical Pacific and its related climate impacts. GOALS is designed to continue research necessary for continuous improvements of El Niño predictions and to extend predictability of climate fluctuations beyond the tropical Pacific to include the effects of the other tropical oceans, higher latitude oceans, and land surface processes on seasonal-to-interannual climate variability, particularly at higher latitudes. For more information on GOALS, please visit the following website: <http://www.ogp.noaa.gov/MPE/GOALS/goals.html>

Data Validation and Verification:

Data collection: Satellite data sets from NOAA and Department of Defense environmental satellites, and *in situ* data sets worldwide from ships, buoys, aircraft, radiosondes.

Frequency: Annual

Data storage: National Environmental Satellite, Data, and Information Service's National Climatic Data Center in Asheville, NC, and Office of Satellite Data Processing and Distribution in Suitland, MD

Verification: NOAA performs quality control, including error checking, elimination of duplicates, and interstation comparison. In addition, for the satellite data, NOAA itself does the data processing

Data limitations: In the future, the National Oceanographic Data Center and the National Geophysical Data Center may also contribute to this performance measure, if funding levels permit. Compilation of the *in situ* data sets, particularly the global data sets, relies on continued international data exchange cooperation.

Actions to be taken: NOAA will meet the growing demand for environmental data to a rapidly expanding user base by first addressing base erosion created by inflationary increases. This measure tracks NOAA's success in providing data to a diverse user community.

Data Validation and Verification:

Data collection: Progress reports

Frequency: Annual

Data storage: NOAA Office of Global Programs, Silver Spring, MD

Verification: Progress is reported to NOAA management at Quarterly Reviews.

Data limitations: The Global Ocean-Atmosphere-Land System Program has been formulated to continue improvements in the prediction of ENSO, extend our understanding and predictive capability to include global seasonal-to-interannual climate variations, and develop the observational and computational means for predicting these variations. Should the program be prolonged due to, for example, unexpected research findings or fiscal constraints, the program could be extended and the percentage of the program completed could stall.

Actions to be taken: The GOALS program lifetime is 1995-2010. At its conclusion, the program's measure of success will be our increased understanding of global climate variability and predictability on seasonal-to-interannual time scales. In order to achieve the objectives of GOALS, the program has four major elements: a) modeling, b) observations, c) empirical studies, and d) process studies.

Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts

Program Evaluation Efforts

A number of NOAA line offices participate in the seasonal-to-interannual performance goal. The Office of Oceanic and Atmospheric Research (OAR) conducts periodic reviews of the activities of its Environmental Research Laboratories. The NESDIS holds management performance reviews several times each year. The NWS conducts reviews of the National Centers for Environmental Prediction (NCEP). Programs are also evaluated by the National Science Foundation and the National Research Council. NOAA also holds annual constituent workshops at which NOAA's seasonal climate forecast efforts are discussed with the community of seasonal-to-interannual climate forecast users and input is solicited to shape future efforts.

Strategies and Activities

| Strategies | Activities | Budget Request |
|--|---|----------------|
| Improve our ability to forecast seasonal climate variability, including temperature and precipitation, to provide significant socio-economic benefits to the United States, including the protection of life and property. | Implement climate prediction systems to deliver useful seasonal-to-interannual climate forecasts for the U.S. and collaborate in a multi-national effort to generate and use similar forecasts. | \$19.5M |
| Analyze, distribute, and save information from climate observations and data systems to further build our research and forecasting efforts. | Enhance global observing and data systems required to provide data for the initialization and validation of model predictions of seasonal-to-interannual climate variations. | \$71.6M |
| Emphasize research to improve our understanding of El Niño and other modes of climate variability, and improve models and accuracy of predictions with longer lead times. | Invest in process and modeling research that leads to improved predictability of temperature and rainfall distributions. | \$29.9M |
| Foster discussion and assessments with various user communities to ensure that they understand and benefit from our climate forecasts; solicit user input to generate more useful forecasts. | Assess the impacts of climate variability on human activity and economic potential, and improve public education so that climate forecasts are understood and acted upon. | \$0.4M |

Resource Requirements

Total Dollars: \$129.5 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$109.2 M | \$121.2 M | \$129.5 M |

Total FTE: 563

Skill Requirements: Meteorologists, Oceanographers, Physical Scientists, Atmospheric Scientists, Computer Specialists

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 549 | 561 | 563 |

Total IT Dollars: \$27.8 million

IT Requirements: Satellite Active Archive: \$1.5M, NOAA Virtual Data System: \$2.5M, National Environmental Data Archive & Access System \$4.0M, Climate Prediction Centers Climate Computer

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$20.4M | \$16.7M | \$27.8M |

Performance Goal 2: Implement Seasonal to Interannual Climate Forecasts

Cross-Cutting Activities

Other Government Agencies

NOAA works with a wide variety of partners in the area of climate forecasts, including other Federal agencies (e.g., the Federal Emergency Management Agency (FEMA) and the Agency for International Development), State and local agencies (e.g., State departments of environmental protection and emergency preparedness managers), academia, foreign government agencies, and international organizations. In preparing for the 1997-1998 El Niño, NOAA worked closely with FEMA and State and local officials, greatly improving the public preparedness for the severe weather resulting from El Niño.

External Factors and Mitigation Strategies

- A major failure of the earth observing and computing infrastructure would impair NOAA's ability to produce seasonal-to-interannual forecasts. NOAA has been looking for backup outside the organization. For example, the Department of the Navy provides backup to the National Centers for Environmental Prediction mainframe computer.
- An unanticipated major increase of the customer base for climate related products may strain NOAA resources. In such event, NOAA would prioritize its activities to meet the immediate increase in demand, while it looks for alternative ways to meet the needs of all its customers.

Performance Goal 3: Predict and Assess Decadal to Centennial Change

Rationale for Performance Goal

Policymakers require, and NOAA and its partners provide, science-based information for decisions regarding decadal to centennial changes in the global environment, specifically for climate change and greenhouse warming; ozone layer depletion; and air quality improvement.

Measure 3.a:

Document the "turnover" of CFC source gases (whose atmospheric abundance is expected to begin decreasing in 1998) to verify the effectiveness of global policy actions

| Documents on Turnover | | | | |
|-----------------------|------|------|------|------|
| 1998 | 1999 | 2000 | 2001 | 2002 |
| N/A | 1 | N/A | N/A | 1 |

Data Validation and Verification:

Data collection: Research from NOAA/OAR/ERL/ Aeronomy Laboratory

Frequency: Aperiodic (approximately every 3-5 years)

Data storage: NOAA Aeronomy Laboratory, Boulder, CO

Verification: Data are taken using proven, peer-reviewed procedures. The results are also peer-reviewed by internationally qualified experts as part of the publication process.

Data limitations: Turnover of gases refers to the increase and decrease of specific gases in the atmosphere over time. Five years is the period generally used to expect reasonable progress in a field such that a new assessment or report could be justified. Those products take 2 ½ to 3 years to produce. The scientific assessments of the state of our understanding of the stratospheric ozone depletion are sponsored by NOAA, the National Aeronautics and Space Administration, the United Nations Environmental Program, and the World Meteorological Organization. They are undertaken every three to five years based on advancements in the science. The fourth assessment was published in 1999. The fifth is underway at this time.

Actions to be taken: Collect information and produce reports for peer-reviewed publication.

Explanation

Chlorofluorocarbons (CFCs) are man-made pollutants that react with the natural environment of the upper atmosphere and cause damage to the earth's protective ozone layer. Worldwide concern over the depletion of the ozone layer forced global policies that restrict CFC production. Policy makers rely on the community of atmospheric scientists to document if new regulations are decreasing CFCs and restoring the earth's ozone layer.

Performance Goal 3: Predict and Assess Decadal to Centennial Change

Measure 3.b:

Publish updated trend results of air quality measurements

| Number of Publications | | | | |
|------------------------|------|------|------|------|
| 1998 | 1999 | 2000 | 2001 | 2002 |
| N/A | 1 | N/A | 1 | N/A |

Data Validation and Verification:

Data collection: Research from NOAA/OAR/ERL/ Aeronomy Laboratory

Frequency: Biennial

Data storage: NOAA/Air Resources Laboratory, Silver Spring, MD

Verification: Data are taken using proven, peer-reviewed procedures. The results are also peer-reviewed by internationally qualified experts as part of the scientific publication process.

Data limitations: Five years is the period generally used to expect reasonable progress in a field such that a new assessment or report could be justified. Those products take two and a half to three years to produce

Actions to be taken: Collect information and produce reports for peer-reviewed publication.

Explanation:

NOAA's mission includes the responsibility to publish scientific findings in the peer-reviewed science literature and to communicate results to the public. This performance measure indicates how well long-term climate findings are being reported to a growing community of climate scientists and to an increasingly concerned public constituency.

Measure 3.c:

Lead development of a peer-reviewed initial assessment of regional ozone in North America, including summarizing results for customers

| Number of Publications | | | | |
|------------------------|------|------|------|------|
| 1998 | 1999 | 2000 | 2001 | 2002 |
| N/A | 1 | N/A | N/A | 1 |

Data Validation and Verification:

Data collection: Research from NOAA/OAR/ERL/ Aeronomy Laboratory

Frequency: Aperiodic (approximately every 3-5 years)

Data storage: Research from NOAA/Aeronomy Laboratory, Boulder, CO

Verification: Data are taken using proven, peer-reviewed procedures. The results are also peer-reviewed by internationally qualified experts as part of the publication process.

Data limitations: Five years is the period generally used to expect reasonable progress in a field such that a new assessment or report could be justified. Those products take two and a half to three years to produce. The assessments conducted under the North American Research Strategy for Tropospheric Ozone are conducted on a three to five year interval determined by the scientific advancements that have occurred and the perceived requirements for updates to Congress, the Office of Science and Technology Policy, and the interagency Committee on Environment and Natural Resources. The chart above represents the present assessment schedule.

Actions to be taken: Collect data and provide assessment of regional ozone and air quality

Explanation

Regional ozone affects public health by reducing air quality. This measure will provide a baseline assessment of regional ozone in North America, and provide vital data to air quality managers and decision makers.

Performance Goal 3: Predict and Assess Decadal to Centennial Change

Measure 3.d:

Results of 90% of the research activities cited in the 2001 IPCC Third Assessment of Climate Change

| Research Activities | | | | |
|---------------------|------|-----------|------|------|
| 1999 | 2000 | 2001 | 2002 | 2003 |
| N/A | N/A | 90% cited | N/A | N/A |

Data Validation and Verification:

Data collection: Research from NOAA/OAR/Aeronomy Laboratory

Frequency: Aperiodic (approximately every 3-5 years)

Data storage: NOAA Aeronomy Laboratory, Boulder, CO

Verification: Data are taken using proven, peer-reviewed procedures. The results are also peer-reviewed by internationally qualified experts as part of the publication process.

Data limitations: The time scales of processes influencing the climate system vary from years to millennia. Changes in the rates of emissions of greenhouse gases take years to decades to implement; the stabilization of the concentrations of long-lived species in the atmosphere takes decades to millennia; equilibration of the climate system given a stable level of greenhouse species takes decades to centuries; equilibration of sea level given a stable climate takes centuries; and even though the impact on ecological systems may be relatively rapid, restoration or rehabilitation of disturbed ecological systems may take decades to centuries. The IPCC (Intergovernmental Panel on Climate Change) Assessments provide the scientific, technical, and economic information that can be used inter alia in evaluating whether there are possible interferences in the climate system and in evaluating adaptation and mitigation strategies that could be used in stabilizing greenhouse species in the atmosphere at a level that would prevent interferences with the climate system. These Assessments are conducted under the sponsorship of the World Meteorological Organization and the United Nations Environment Programme and take several years to produce. They are undertaken every three to five years based on advancements in science. The last assessment was published in 1995 and the next is underway at this time.

Actions to be taken: Collect information and produce reports for peer-reviewed publication.

Explanation

The Earth absorbs radiation from the sun, primarily at the land and sea surface. This energy is then redistributed by atmospheric and oceanic circulation and radiated back to space. Any factor which alters the radiation received from the Sun or lost to space, or which alters the redistribution of energy within the atmosphere, and between the atmosphere, land and ocean can affect climate. Policymakers look to the community of atmospheric and oceanographic scientists to provide periodic updates on our understanding of the science of climate change and potential impacts of humans and the natural environment.

Program Evaluation Efforts

NOAA's programs are routinely evaluated by a variety of outside reviewers. The NOAA Science Advisory Board, made up completely of private sector, university, and other Federal agency scientists, provides input on Climate and Air Quality Research. NOAA's Office of Global Programs, funded in OAR's Climate and Global Change research line item, receives review from international science agencies, universities and private sector scientists, as well as the National Research Council and the National Science Foundation. The NOAA Research Laboratories are reviewed on a regular basis. The Sea Grant Colleges are visited at least every two years by a review panel.

Performance Goal 3: Predict and Assess Decadal to Centennial Change

Strategies and Activities

| Strategies | Activities | Budget Request |
|--|--|----------------|
| Characterize the agents and processes that force decadal to centennial change. | Natural events and human activities can cause changes in climate. The atmospheric amounts of many greenhouse gases are increasing. This goal addresses understanding natural and man-induced greenhouse processes. | \$9.3M |
| Understand the role of the ocean as a reservoir of both heat and carbon dioxide to address a major source of uncertainty in climate models. | Research has highlighted the role of the oceans in climate change. Accurate simulations of the coupled air-sea system are essential for predicting and assessing climate variability. | \$29.8M |
| Ensure a long-term climate record by enhancing domestic and international weather networks, observing procedures, and information management systems. Document present and past changes and variations in the climate system, including extreme events, and rapid climate changes, exploiting national and international observing networks, satellites, and paleoclimatic data. | A well-documented, long-term record of climate data is required to ascertain the sensitivity of the climate system to changes in atmospheric composition and the impact of climate change on socio-economic, biogeochemical, and physical systems. | \$32.6M |
| Guide the rehabilitation of the ozone layer by providing the scientific basis for policy choices associated with ozone-depleting compounds and their replacements. | A better definition of which substitutes are "ozone-friendly" will help our chemical industry avoid production of a substitute that later proves to destroy unacceptable amounts of ozone. | \$7.1M |
| Provide the scientific basis for better air quality by improving the understanding of high surface ozone episodes in rural areas and by strengthening the monitoring network to detect cleaner air quality and improving the characterization of airborne fine particles. | Stations that detect air quality must be upgraded and maintained to provide the required information to achieve a more effective Clean Air Act implementation. | \$5.4M |
| Develop models for the prediction of long-term climate change (including extreme events and rapid climate changes), carry out scientific assessments, and provide human impacts information. | Explanatory environmental models must be strengthened through better understanding of the atmospheric and oceanic processes to meet the challenges of understanding and foreseeing climate variability and long term changes. | \$13.0M |

Performance Goal 3: Predict and Assess Decadal to Centennial Change

Resource Requirements

Total Dollars: \$114.2 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$92.2 M | \$95.4 M | \$114.2 M |

Total FTE: 508

Skill Requirements: Meteorologists, Instrumentation Engineers, Oceanographers, Instrumentation Technicians, Computer Scientists, Chemists, Physicists, Mathematicians, Electronic Engineers

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 485 | 486 | 508 |

Total IT Dollars: \$7.0 million
IT Requirements: Geophysical Fluid Dynamics Laboratory (GFDL)

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$9.6 M | \$5.0 M | \$7.0 M |

Cross-Cutting Activities

Intra-DOC

NOAA, in partnership with *ITA and TA* within the Department of Commerce, other Federal agencies, the private sector, and academia, is providing the foundation the U.S. will depend upon to lead new emerging global industries in economically and environmentally sustainable ways.

Other Government Agencies and the Private Sector

- NOAA depends strongly on universities to help accomplish its science objectives through a network of *Joint and Cooperative Institutes* and universities.
- NOAA also funds academic researchers through competitive, peer-reviewed programs, including the Global Climate Change Program.

External Factors and Mitigation Strategies

The science of climate change crosses generations and has progressed through the evolution of technology. Our ability to accomplish measures of performance like these is contingent upon many external factors, including the advancement of climate change itself.

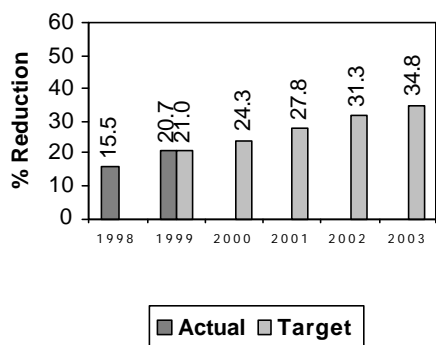
Performance Goal 4: Promote Safe Navigation

Rationale for Performance Goal

NOAA serves commercial and recreational mariners around the Nation by providing these customers with nautical charts, tides and currents data, and geographic positioning data for safe navigation. Geodetic services are vital to the broader mapping and surveying industry nationwide. Shoreline data and real-time tides and currents information also serve the coastal resource management and oil spill/disaster response communities. NOAA is currently exploring innovative ways to modernize its services in a cost-efficient manner to meet customer needs.

Measure 4.a:

Percent reduction in the backlog (square nautical miles) of hydrographic surveys for critical areas (cumulative)



Data Validation and Verification:

Data collection: Progress reports on data collected from hydrographic survey platforms.

Frequency: Annual

Data storage: National Ocean Service will store data and publish nautical charts.

Verification: National Ocean Service will apply established verification and validation methods

Data Limitations: Progress in reducing the backlog is measured against a baseline value of 43,000 square nautical miles as determined in 1994. Weather can affect scheduled surveys.

Actions to be taken: Coordinate acquisition and processing of hydrographic surveys both in-house and through contracts

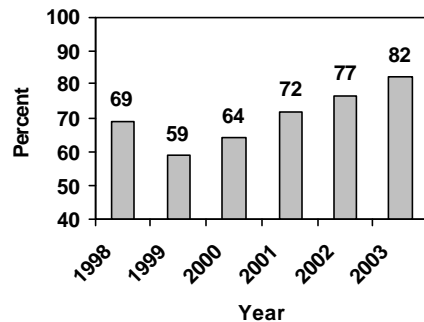
Explanation

Hydrographic surveys are conducted to determine depths and the configuration of the bottoms of water bodies, especially as it pertains to navigation. This includes the detection, location, and identification of wrecks primarily through the use of side scan sonar and multibeam sonar technology and GPS. This information is critically important to the production of both paper and electronic nautical charts for safe and efficient navigation; other user communities that benefit in addition to the commercial shipping industry include recreational boaters, the commercial fishing industry, port authorities, coastal zone managers and disaster response planners. Ships traversing our coastal waters are relying on charts based on sounding data that are more than 50 years old in many places. In 1994, NOAA identified 43,000 square nautical miles of seafloor in U.S. waters in critical need of resurvey, with over half of this area in Alaskan waters. Many of these high priority areas carry heavy commercial traffic, are less than 30 meters deep, and are changing constantly. NOAA's surveying activities balance in-house resources with contracts and use the latest full bottom coverage sounding technologies to eliminate the remaining critical area backlog of approximately 34,100 square nautical miles in the Nation's ports, harbors and other coastal areas. NOAA's hydrographic fleet supporting in-house surveying capabilities consists of the WHITING, RUDE and RAINIER. For more information on the hydrographic survey program, please access the NOAA website at <http://chartmaker.ncd.noaa.gov/ocs/text/hydrog.htm#survey>.

Performance Goal 4: Promote Safe Navigation

Measure 4.b:

Cumulative percent of National Spatial Reference System (NSRS) complete to provide a common geographic framework tied to the Global Positioning System



Data Validation and Verification:

Data collection: National Ocean Service/National Geodetic Survey which defines and manages the NSRS, the foundation for the Nation's spatial data infrastructure

Frequency: Ongoing, annual reporting

Data storage: Automated database at National Ocean Service

Verification: National Ocean Service will apply standard verification and validation methods.

Data Limitations:

Actions to be taken: Statistics on completion.

Explanation

In order to meet the Nation's navigation and other positioning needs, NOAA is enhancing the NSRS to provide the higher accuracy and accessibility needed for use with the space-based Global Positioning System (GPS). GPS satellites transmit signals that allow determination of position, height, velocity and time. The NSRS, a system of reference stations and monuments across the Nation, provides integrity to geographic coordinates obtained from GPS satellite signals for accurate positioning in support of numerous applications including land surveying, navigation, mapping, infrastructure development including 911 emergency response, and scientific applications. New uses for GPS are being found every day, and many of these new uses involve precision heights; NOAA launched its Height Modernization effort in 1998 to accelerate completion of the NSRS in three dimensions. Access to accurate, reliable real-time height data can save time and money, and protect lives, property, and the environment. For more information on applications and benefits of height modernization, please refer to the NOAA website at http://www.ngs.noaa.gov/initiatives/height_modernization.shtml.

Program Evaluation Efforts

A number of Marine Board (National Research Council) studies were carried out between 1992 and 1996 to evaluate the nautical charting program and its transition into the digital era. Study recommendations have been incorporated into the program and their successful implementation is being monitored through existing performance measures. Particularly important are the recommendations for reducing the survey backlog, implementing new digital production techniques, and delivering new electronic chart products. Another important recommendation urged the program to make substantial use of contract support for all aspects. In FY 1995, contracting was less than 5% of the program activities; in FY 2000 contract support will approach \$19 million, more than half of the program's annual appropriation. In 1996 the National Academy of Public Administration examined all of the programmatic components of Promote Safe Navigation to determine if they could be converted into a performance-based organization. The result of the study found that these essential programs would not survive on product receipts.

More recently the marine transportation community strongly expressed the need for integrated real-time information, forecasts and cooperation across federal agencies to achieve a safe and efficient navigation system at NOAA-sponsored stakeholder meetings in 1998 and 1999, and at the Department of Transportation's Marine Transportation

Performance Goal 4: Promote Safe Navigation

System (MTS) National Conference held in November of 1998. The September 1999 Report to Congress that assessed the U.S. Marine Transportation System further articulated the need for clearly defined, coordinated and consistent Federal leadership to achieve the MTS vision: becoming the world's most technologically advanced, safe, efficient, globally competitive and environmentally responsible system for moving goods and people. NOAA's navigation safety and support functions underwent substantial review to identify opportunities for greater coordination and focus areas among Federal agencies.

The Hydrographic Services Improvements Act of 1998 also provided Congress and NOAA an opportunity to evaluate NOAA's capabilities for acquisition and dissemination of hydrographic data, development of standards and formats for hydrographic services, and contracting for the acquisition of hydrographic data. NOAA now contracts out over fifty percent of its annual critical area hydrographic survey requirements while maintaining Federal competence and expertise with existing and developing surveying technologies. Congress also authorized the 1998 Height Modernization Study to evaluate the technical, financial, legal, and economic aspects of modernizing the national height system with GPS. The study demonstrated the significant benefits to the Nation in terms of dollars and lives saved associated with GPS technology, and it led to current development of the vertical component of the National Spatial Reference System.

Strategies and Activities

| Strategies | Activities | Budget Request |
|---|--|----------------|
| Provide mariners with predictions and observations of water levels, tides and currents, and weather conditions in ports. | Increase access to quality-assured tide, current, meteorological and positioning data, particularly in real-time, enabling commercial mariners to navigate in and out of ports efficiently and with confidence that they will not run aground. | \$15.1M |
| Update nautical surveys to accurately chart the depth of the sea floor and identify obstructions to navigation. This survey activity will balance in-house resources with contracts and use the latest full-bottom coverage sounding technologies. | Eliminate the remaining backlog of approximately 34,100 square nautical miles of the total 43,000 square nautical miles critical hydrographic surveys in the Nation's ports, harbors, and other coastal areas. | \$21.2M |
| Build, maintain, and deliver a digital nautical charting database. | Create a digital nautical charting database to support new electronic charting systems which integrate satellite positioning, tidal heights and currents, radar and sonar, and navigational aids. | \$26.1M |
| Enhance the National Spatial Reference System (NSRS) using GPS to support the digital revolution in mapping, charting and surveying. The ability of GPS to accurately measure heights is particularly important to marine surveying and navigation. | Develop an accurate national spatial reference system as the Nation relies increasingly upon the satellite Global Positioning System (GPS) for surveying and navigation. | \$20.2M |
| Delineate the national shoreline using state-of-the-art technology to serve the Nation's navigational and coastal management requirements. | Provide accurate shoreline data, a critical component of nautical charts. | \$4.8M |

Performance Goal 4: Promote Safe Navigation

Resource Requirements

Total Dollars: \$109.5 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$97.6 M | \$104.6 M | \$109.5 M |

Total FTE: 868

Skill Requirements: Cartographers, Photogrammetrists, Geodesists, Hydrographers, Meteorologists, Oceanographers, Physical Scientists, Engineers, Computer Scientists

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 878 | 878 | 868 |

Total IT Dollars: \$3.7 million

IT Requirements: Nautical Charting and Hydrographic Surveying System; Physical Oceanographic Real-Time Systems (PORTS) and Data Processing and Analysis Subsystem (DPAS) for National Water Level Observation Network; Geodetic Support System.

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$3.9M | \$3.2M | \$3.7M |

Cross-Cutting Activities

Intra-DOC

NOAA, in partnership with Technology Administration and the National Telecommunications and Information Administration within the Department of Commerce, and other civil agencies from all civil departments, participates on the Interagency GPS Executive Board, which jointly manages the GPS satellite program as a national asset with the Department of Defense. Now a dual-use system heavily employed by civilian and commercial sectors, GPS is a global information utility that the United States has committed to provide free to the world for use as the international standard for navigation, positioning and timing.

Other Government Agencies and the Private Sector

NOAA works closely with agencies such as the Department of Transportation, the U.S. Coast Guard and the U.S. Army Corps of Engineers in support of Marine Transportation System goals and objectives to identify and improve navigation services for maritime commerce, while preserving navigation and environmental safety. NOAA and the Department of Transportation also cooperate on the development of the Nationwide Differential GPS System, which employs NOAA's Continuously Operating Reference Stations to enable high accuracy GPS positioning in three dimensions across the Nation. This system benefits from a multi-purpose cooperative effort between government, academia and the commercial sector, and supports numerous NOAA objectives and activities.

NOAA's Physical Oceanographic Real-Time Systems (PORTS) are also partnership opportunities between NOAA, local government and the private sector. PORTS is a public information system developed by NOAA that furnishes real-time information to the general public for safe and cost-effective navigation, search-and-rescue, hazardous material and oil-spill prevention and response, and scientific research. PORTS builds on NOAA's National Water Level Observation Network of 175 stations to provide real-time water levels, currents, oceanographic and meteorological data, nowcasts and predictions from bays and harbors to the maritime community in a variety of user-friendly formats, including telephone voice response and Internet. Port authorities underwrite the system's operation and maintenance, and NOAA provides data quality assurance and dissemination. NOAA hopes to expand its quality assurance capabilities to support future PORTS systems.

Performance Goal 4: Promote Safe Navigation

External Factors and Mitigation Strategies

Weather has a significant impact on Promote Safe Navigation activities. Both in-house and contract hydrographic survey schedules can be affected by adverse weather conditions (storm, winds, high seas) and equipment failure, as can aerial photography flights scheduled for shoreline photogrammetry. Storm damage frequently renders water level stations inoperable, affecting surveying capabilities and real-time observations of water levels and currents so critical to safe navigation. Natural disasters such as earthquakes and hurricanes can elevate the critical priority of an area because of shoreline changes or obstruction accumulation; man-made impacts such as shifts in shipping patterns, newly regulated shipping lanes, port expansions or wrecks will also increase NOAA's designated critical areas. NOAA also receives requests to survey areas not identified as critical; for example, ship groundings frequently prompt requests from the Coast Guard and others to survey "non-critical" areas, diverting efforts away from the survey schedule. Finally, in addition to mission activities, NOAA ships and aircraft provide immediate response capabilities for unpredictable events such as recovery and search efforts after the TWA Flight 800 and EgyptAir Flight 990 crashes, damage assessment after major oil spills such as the *Exxon Valdez*, the Persian Gulf War and the *New Carissa*, and severe hurricanes. NOAA mitigates the impacts of weather, disaster events and equipment malfunction with back-up plans for relocating assets to other projects, or by reassessing schedules for other windows of opportunity.

Performance Goal 5: Build Sustainable Fisheries

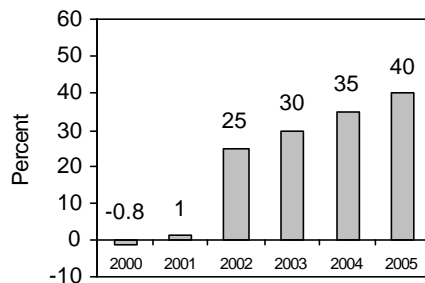
Rationale for Performance Goal

Billions of dollars in economic growth, thousands of jobs, and countless recreational fishing opportunities are wasted as a result of overfishing and overcapitalization in commercial and recreational fisheries. While many fisheries are well managed and produce positive benefits, others are severely depleted or overcapitalized, and must be restored and managed to realize their long-term potential. Rebuilding and reducing overcapitalization in existing fisheries will promote the economic and biological sustainability of U.S. fishing resources. Building sustainable fisheries will increase greatly the Nation's wealth and quality of life.

Measure 5.a:

By 2005, 25% fewer overfished fisheries (Currently 86 of 279 stocks are overfished.

By 2005, of these 86 stocks, 22 will no longer be overfished.)



Data Validation and Verification:

Data collection: NOAA/ National Marine Fisheries Service (NMFS)
Report to Congress: Status of Fisheries of the United States.

Frequency: Annual

Data storage: NOAA/NMFS Office of Sustainable Fisheries

Verification: Stock assessments and peer-reviews (internal and outside the agency)

Data Limitations:

Actions to be taken: The Magnuson-Stevens Sustainable Fisheries Act, reauthorized in 1996, requires that overfishing be eliminated in ten years. A period of two years has been provided to amend the Fisheries Management Plans of affected overfished stocks to reflect the new law. The 25% goal means that the currently 86 overfished fisheries will be reduced to 64 or less by 2005. External factors that may affect NOAA's ability to reach this target include the impact of climate and other natural conditions, such as El Niño, on fisheries stocks.

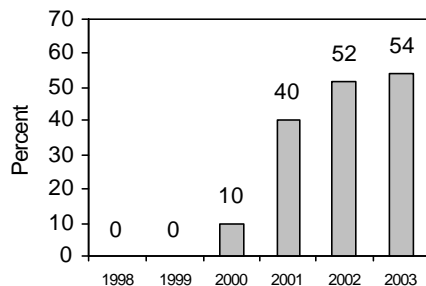
Explanation:

To eliminate overfishing and allow fishing at sustainable levels, considerable information is necessary about the stock size and age structure and the physical and biological processes that control the ecosystem dynamics. This measure indicates that our actions will result in a decrease in the number of fisheries that are classified as overfished. As reported in the 1997 NOAA Fisheries Report to Congress, 86 fisheries were classified as overfished of the 279 fisheries for which we have information. The 25% goal means that we will reduce the number of overfished fisheries from 86 to 64 or less by 2005. The quantification will be based on the NOAA Fisheries Annual Report to Congress on Overfishing.

Performance Goal 5: Build Sustainable Fisheries

Measure 5.b:

By 2005, 60% of stocks have sufficient essential fish habitat



Data Validation and Verification:

Data collection: Regional offices of NOAA/NMFS

Frequency: Annual

Data storage: Regional Office of NOAA/NMFS

Verification: Interagency and internal peer-review.

Data limitations:

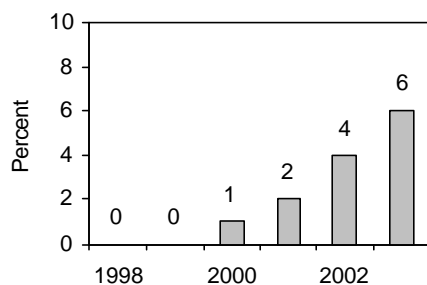
Actions to be taken: The reauthorization of the Magnuson-Stevens Sustainable Fisheries Act of 1996 requires NMFS to identify, protect and restore essential fish habitats. Regulations have been promulgated to define "essential fish habitat," and Regional Fisheries Management Councils, as key stakeholders, have participated extensively in this regulatory process. External factors that may affect NOAA's ability to reach this target include the impact of biological and other natural conditions.

Explanation

This performance measure is a way to measure progress with the Essential Fish Habitat provisions of the Magnuson-Stevens Fisheries Conservation and Management Act. Habitat is crucial for fisheries recruitment and the maintenance of healthy "fishable" stocks. The measure above focuses on the percentage of stocks that have adequate habitat.

Measure 5.c:

By 2005, 9% increase in employment in non-capture fishing and other sectors in fishing communities



Data Validation and Verification:

Data collection: U.S. Department of Commerce/ Bureau of Economic Analysis & NMFS

Frequency: Annual

Data storage: U.S. Department of Commerce/Bureau of Economic Analysis & NMFS

Verification: BEA and/or NMFS has been consulted and may provide the information and verification.

Data limitations: BEA statistical data is by county, not by fishing community.

Actions to be taken: NMFS has approached the Bureau of Economic Analysis to provide the information starting with 1999 figures. External factors that may affect NOAA's ability to reach this target include impact of national and/or local economic conditions. Non-capture fishing is aquaculture. NMFS has begun discussions with BEA to evaluate the utility of their data as a metric for this performance measure. NMFS will define "fishing communities" and work with BEA data and other data to provide a baseline and a measurement methodology.

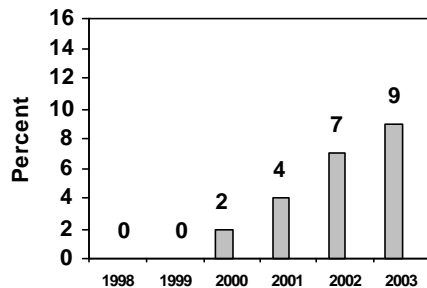
Explanation

The rebuilding of overfished stocks required under the Magnuson-Stevens Act will result in lower harvest levels, and therefore fewer fishing vessels and fishing-related jobs and a potential for overall reduction in economic activity in many coastal communities. The measure above will account for our activities to shift employment from traditional fishing to aquaculture (non-capture fishing) and to other vocations, especially marine vocations that will help minimize community change. NOAA is working with other Federal, State and local agencies to address these impacts on fishing communities through a variety of programs including loans, retraining, vessel and permit buyouts, and community planning. While NOAA alone does not cover the total costs of such programs, it acts as a catalyst in working with other DOC agencies such as the Economic Development Administration and with other Federal agencies such as the Department of Labor and the Small Business Administration to coordinate community assistance to address the economic and social impacts of reduced fishing levels.

Performance Goal 5: Build Sustainable Fisheries

Measure 5.d:

By 2005, 17% increase in economic contribution of aquaculture to Gross Domestic Product



Data Validation and Verification:

Data collection: NOAA/NMFS, BEA, U.S. Department of Agriculture

Frequency: Annual

Data storage: BEA, NMFS, USDA

Verification: Discussions with BEA have been initiated, and a satellite account to provide aquaculture economic information may be established.

Data limitations: NMFS data is reported about 18 months after the end of a calendar year. The first USDA aquaculture census occurred in 1998, and will be repeated only every third year.

Actions to be taken: BEA will serve as a satellite account. Aquaculture is defined as marine aquaculture, including the Great Lakes. External factors that may affect NOAA's ability to reach this target include the impact of national and/or local economic conditions. Aquaculture is total U.S. aquaculture production, less catfish and trout. NOAA will work with BEA, USDA and with NMFS to define measurement methodologies.

Explanation

Marine aquaculture can play an important role in producing fish for food, thereby reducing our dependence on wild stocks, and can offer new business and employment opportunities in coastal communities impacted by reduced fishing activity. In addition to food production, aquaculture can also be used to enhance wild stock populations, assist in recovery plans for protected species and to produce non-food products such as ornamental fish, baitfish, and drugs and pharmaceuticals. The measure above specifically addresses economic benefits to the Nation of increased aquaculture production.

Program Evaluation Efforts

Virtually every aspect of the National Marine Fisheries Service fisheries science program is peer reviewed, either internally within NMFS or outside the agency, e.g., the National Academy of Sciences and the National Science Foundation. NMFS also relies on extensive informal networks of university partnerships and laboratories throughout the Nation. Moreover, reviews often occur by opposing parties' scientists in the court system when fisheries management decisions are litigated.

Performance Goal 5: Build Sustainable Fisheries

Strategies and Activities

| Strategies | Activities | Budget Request |
|--|--|----------------|
| As evidenced by the Sustainable Fisheries Act amendments, there is a strong consensus among lawmakers, fishery managers, the fishing industry, and the public that depleted fishery resources must be restored and that healthy fisheries must be maintained and managed for greater efficiency. | Eliminate and prevent overfishing and overcapitalization. | \$292.6M |
| The rebuilding of overfished fisheries required under the Magnuson-Stevenson Act will result in lower harvest levels, and therefore fewer fishing vessels and fishing-related jobs, and potentially an overall reduction in economic activity in many coastal communities. To minimize economic impact of fisheries management decisions on communities, NOAA is working with other Federal, State, and local agencies to address these impacts on fishing communities through a variety of programs including loans, retraining, vessel and permit buyouts, and community planning. | Attain economic sustainability in fishing communities. | \$66.6M |
| Sound marine aquaculture will enhance the Nation's ability to meet the growing domestic and global demand for seafood, as a growing number of wild stocks are overfished or fully utilized. | Develop environmentally and economically sound marine aquaculture. | \$29.4M |

Resource Requirements

Total Dollars: \$435.4 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$411.5 M | \$441.6M | \$435.4M |

Total FTE: 2,481

**Skill Requirements: Fishery Biologists,
Fishery Economists**

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 2,330 | 2,371 | 2,481 |

Total IT Dollars: \$33.0 million

IT Requirements: National Marine Fisheries Service Fishing Information Technology System

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$24.5M | \$24.0M | \$33.0M |

Performance Goal 5: Build Sustainable Fisheries

Cross-Cutting Activities

Intra-DOC

NOAA will focus on reducing overfishing and overcapitalization of U.S. fishery resources by improving stock assessment and prediction, improving essential fisheries habitat, and reducing fishing pressure, including downsizing of fishing fleets. The Department of Commerce, enlisting the support of key bureaus such as EDA, MBDA, and NIST, and other Federal agencies, such as the U.S. Department of Agriculture, Small Business Administration, and the U.S. Department of Labor, will play a key role in mitigating the impact of these critical resource conservation decisions in the transition to economically sustainable communities.

External Factors and Mitigation Strategies

There are external factors that may affect NOAA's ability to reach the targets mentioned in this report. These factors include the impact of climate and other natural conditions, such as El Nino on biological stocks. In addition, the impact of national and/or local economic conditions may affect NOAA's ability to reach certain targets.

Performance Goal 6: Recover Protected Species

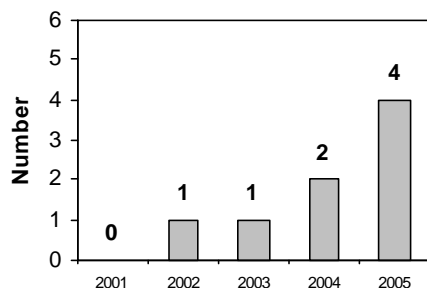
Rationale for Performance Goal

NOAA's overall objectives for recovering protected species are to prevent the extinction of protected species and to maintain the status of healthy species. NOAA measures its performance in meeting these objectives by focusing on the agency's ability to manage protected species through conservation programs and recovery plans, and through constant monitoring and research regarding the status of species and the stresses that affect their mortality.

Quantitative measures of the probability of extinction for protected species were developed in FY 1999 and FY 2000 to establish the baseline from which program performance (reduction in the probability of extinction) is to be measured. NMFS recognizes the need for objective procedures to determine the status of protected species based on population analyses that take into account species biology and threats to existence that are both human-caused and natural. The RPS FY 2001-2005 budget proposal is based in part on measuring our ability to reduce the probability of extinction for at-risk species. RPS performance will be measured by the results of our attempts to reduce the risk of extinction for protected species from detrimental human activities, e.g., reducing incidental and direct takes, increasing species habitat, decreasing negative interactions, and mitigating natural phenomena.

Measure 6.a:

By FY 2005, reduce the probability of extinction of 5 threatened species out of 23 threatened species (cumulative)



Data Validation and Verification:

Data collection: NMFS

Frequency: Annual

Data storage: NMFS Office of Protected Resources

Verification: Audits. Internal peer-review within NOAA and external peer-review by regional fishery councils, the National Science Foundation, the National Academy of Sciences, and other organizations.

Data limitations: None

Actions to be taken: Reducing the probability of extinction requires a reduction in human activities detrimental to the survival of protected species, i.e. reducing incidental and direct takes, increasing species habitat, decreasing negative interactions, and mitigating natural phenomena.

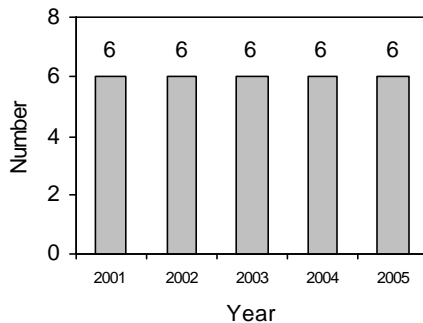
Explanation

5 of the 23 threatened species have been identified to be the most critical threatened species in danger of progressing to endangered species listings. Several include the North Atlantic loggerhead turtle, Pacific salmonids, and Johnson's seagrass. Performance will be measured by the results of attempts to reduce the probability of extinction for protected species from detrimental human activities such as reducing incidental and direct takes, increasing species habitat, and mitigating natural phenomena.

Performance Goal 6: Recover Protected Species

Measure 6.b:

By FY 2005 mortality of strategic marine mammal stocks incidental to commercial fishing operations in six fisheries will be at insignificant levels (annual)



Data Validation and Verification:

Data collection: NMFS

Frequency: Annual

Data storage: NMFS Office of Protected Resources

Verification: Audits. Internal peer-review within NOAA and external peer-review by regional fishery councils, the National Science Foundation, the National Academy of Sciences, and other organizations.

Data limitations: None

Actions to be taken: A successful program to reduce mortality of marine mammal stocks will require the following research on marine mammal behavior, assessment of marine mammal populations, reduction of interactions in problem fisheries, and monitoring / analysis via the observer program.

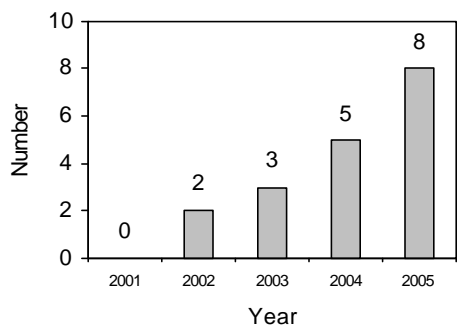
Explanation

One of the most significant impacts on marine mammal stocks is death from entanglement and drowning in fishing gear. Certain marine mammal species are particularly vulnerable to interactions with fisheries due to location and type of fishing gear used. The six fisheries and marine mammal stocks targeted in this measure include: the Harbor porpoise in New England multispecies and Mid-Atlantic gillnet fisheries; Pilot whales, beaked whales, sperm whales and humpback whales in the California/Oregon thresher shark and swordfish drift gillnet fisheries; Pilot whales in the Atlantic pelagic longline fishery; North Atlantic right, humpback, fin, and minke whales in New England multispecies and Mid-Atlantic gillnet fisheries, Gulf of Maine and Mid-Atlantic lobster fisheries, and the southeastern Atlantic shark gillnet fishery. New fishing technologies to reduce gear impacts need to be developed, and strategies to reduce interactions between fishing gear and marine mammals need to be devised. Education is also needed on ways fishermen can avoid marine mammals while still allowing them to catch fish.

Performance Goal 6: Recover Protected Species

Measure 6.c:

By FY 2005, reduce the probability of extinction of 8 endangered species/Endangered Species Units (ESU) (cumulative)



Data Validation and Verification:

Data collection: NMFS

Frequency: Annual

Data storage: NMFS Office of Protected Resources

Verification: Audits. Internal peer-review within NOAA and external peer-review by regional fishery councils, the National Science Foundation, the National Academy of Sciences, and other organizations.

Data limitations: None

Actions to be taken: Reducing the probability of extinction requires a reduction in human activities detrimental to the survival of protected species, i.e. reducing incidental and direct takes, increasing species habitat, decreasing negative interactions, and mitigating natural phenomena.

Explanation

RPS has identified 8 species on a list of 33 endangered species as the most critically in danger of extinction. These 8 species include the Pacific leatherback turtle, Hawaiian monk seal, North Atlantic right whale, Western Steller sea lion, North Pacific right whale, Western Steller sea lion, North Pacific right whale, and Pacific salmonids. Efforts to prevent extinction will focus on identifying the factors contributing to extinction and developing and implementing recovery plans to address these factors.

Program Evaluation Efforts

Evaluation efforts include peer reviews of proposals, internal and external reviews of programs, and quarterly reviews of NOAA's overall performance in protected species recovery. Constituent input is an important part of the evaluation process and is solicited regularly through constituent workshops.

Strategies and Activities

| Strategies | Activities | Budget Request |
|--|--|----------------|
| Prevent extinction of protected species. | Reduce threats of commercial and recreational activities that contribute to stress on marine species and ecosystems, threatening their survival. | \$230.5M |
| Maintain the status of healthy species. | Recover protected species Avoid further decline of other at risk species Improve science to lead to better long-term conservation and management strategies. | \$34.2M |

Performance Goal 6: Recover Protected Species

Resource Requirements

Total Dollars: \$278.3 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$79.6 M | \$154.6M | \$278.3M |

Total FTE: 712
Skill Requirements: Fishery Biologists, Fishery Economists

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 575 | 682 | 712 |

Total IT Dollars: \$33.0 million
IT Requirements: National Marine Fisheries Service Fishing Information Technology System

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$24.5M | \$24.0M | \$33.0M |

Cross-Cutting Issues

Other Government Agencies

Over the past year, NOAA has developed innovative partnerships with the States of Maine, Washington, Oregon, and California to promote the recovery of listed and at-risk salmon and steelhead species.

External Factors and Mitigation Strategies

The impact of climate, biological, and other natural conditions affect NOAA's efforts to recover protected species and maintain the status of healthy species. Research may identify opportunities to pursue mitigating strategies in some cases.

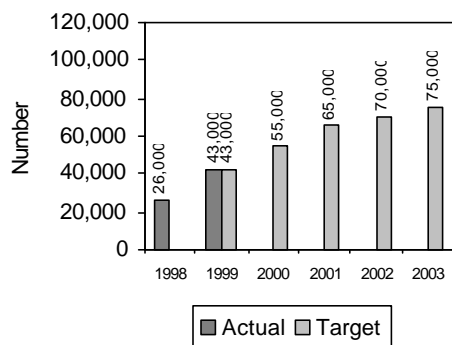
Performance Goal 7: Sustain Healthy Coasts

Rationale for Performance Goal

NOAA has three primary objectives to sustain healthy coastal ecosystems and the communities and economies that depend on them: (1) protect, conserve and restore coastal habitats and their biodiversity, (2) promote clean coastal waters, and (3) foster well-planned and revitalized coastal communities. To meet these objectives, NOAA integrates a broad range of research, assessment and management activities from four of NOAA's five line offices (National Ocean Service (NOS), Office of Oceanic and Atmospheric Research (OAR), National Marine Fisheries Service (NMFS), and the National Environmental Satellite, Data and Information Service (NESDIS)). NOAA works with many government and nongovernmental partners at local, State, national and international levels to address the critical challenges facing coastal areas. NOAA measures its performance in meeting these objectives by tracking key outcomes, such as the number of coastal wetlands restored, changes in coastal water quality, number of coastal States with effective nonpoint pollution control programs, and the percent U.S. shoreline with improved ability to identify and mitigate the impacts of natural hazards.

Measure 7.a:

Number of acres of coastal habitat restored (cumulative)



Data Validation and Verification:

Data collection: Primary source is National Marine Fisheries Service, Office of Habitat Conservation. Other input from National Ocean Service.

Frequency: Annual

Data storage: NMFS/Habitat Office will collect information, conduct assessments, and store data.

Verification: NMFS/Habitat Office will collect quality control data to ensure criteria are being met by data used to calculate performance.

Data limitations: None

Actions to be taken: Continue to initiate and implement restoration projects for critical coastal habitats such as wetlands and coral reefs.

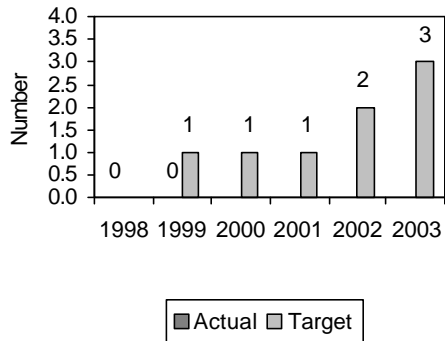
Explanation

This measure shows the cumulative number of acres of coastal wetlands restored through NOAA's National Marine Fisheries Service, Office of Habitat Conservation. The measure represents the outcome of many different restoration projects, most of which are implemented by NOAA in partnership with other Federal agencies, State agencies, and local groups.

Performance Goal 7: Sustain Healthy Coasts

Measure 7.b:

Number of U.S. coastal regions with reduced introductions and impacts of non-indigenous species (total of 6 regions)



Data Validation and Verification:

Data collection: NOAA Office of Oceanic and Atmospheric Research, U.S. Department of the Interior, and state agencies.

Frequency: Annual

Data storage: OAR will collect data, conduct assessments and store data

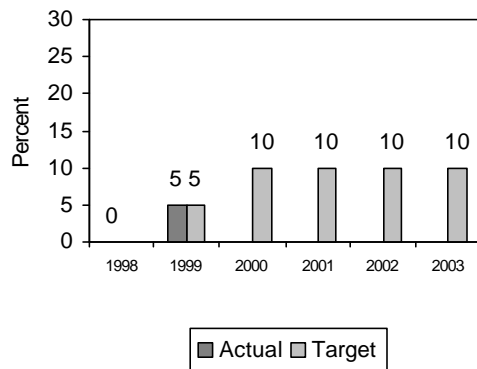
Verification: Original research data verified through peer-review; OAR will obtain quality control data from other sources to ensure criteria are being met for inclusion in performance calculations.

Data limitations: Reaching these targets will also depend on activities of other Federal and State agencies with management responsibilities in this area.

Actions to be taken: Implement program to monitor National Marine Sanctuaries for invasive species; develop rapid response strategy to prevent and control invasives in National Marine Sanctuaries and other areas; continue support for ballast water demonstration projects.

Measure 7.c:

Percent of U.S. shoreline and inland areas with improved ability to identify extent and severity of coastal hazards



Data Validation and Verification:

Data collection: National Ocean Service, other Federal and state agencies.

Frequency: Annual

Data storage: NOS will collect information, conduct assessments, and store data.

Verification: All data used in coastal hazard risk assessments is quality controlled; risk assessment models are tested for accuracy and coverage (amount of shoreline covered).

Data limitations: This measure tracks development and implementation of "coastal hazard risk atlases" as an indicator of improved ability to identify the extent and severity of coastal hazards. Reaching these targets will also depend on activities of other Federal and State agencies with management responsibilities in this area.

Actions to be taken: Evaluate risk of natural hazards for specific U.S. coastal regions; develop coastal risk atlas to identify extent and severity of coastal hazards for coastal regions.

Explanation

This measure tracks improvements in our ability to identify the risks of natural hazards in U.S. coastal regions. Activities are underway to develop coastal risk atlases that evaluate the risk, extent and severity of natural hazards in coastal areas. These risk atlases will help coastal communities more effectively make land use decisions before and after severe events such as storms or floods to reduce risks to life and property. Currently, many coastal communities make major decisions on land-use, infrastructure development, and hazard responses without adequate information on the risks and possible extent of natural hazards impacts in their area.

Performance Goal 7: Sustain Healthy Coasts

Program Evaluation Efforts

NOAA's goal to sustain healthy coasts is the product of over 25 years of experience helping to understand and manage coastal resources so that their ecological and economic productivity can be fully realized and sustained. Evaluation efforts exist at a variety of levels, from peer-reviews of proposals and evaluations of individual projects, to internal and external reviews of entire programs and quarterly reviews of NOAA's overall performance in coastal stewardship areas. Constituent input is an important part of the evaluation process and is solicited regularly through constituent workshops.

Strategies and Activities

| Strategies | Activities | Budget Request |
|---|--|----------------|
| Coastal habitats produce many of the Nation's commercial and recreational fisheries. They also are the foundation for most coastal tourism and recreation industries that contribute over \$58 billion annually to the U.S. economy. Protecting and restoring coastal habitats and their biodiversity is an investment in the long-term sustainability of the Nation's coastal resources and the communities and economies that depend on them. | Protect, conserve, and restore coastal habitats and their biodiversity. | \$192.1 M |
| Clean water is essential for productive coastal ecosystems and sustainable coastal communities. Contaminated coastal waters threaten living resources, human health, and economic stability. The primary source of coastal water pollution is run-off from urban and agricultural areas that washes nutrients and other contaminants into coastal waters. | Promote clean coastal waters to sustain living marine resources and ensure safe recreation, healthy seafood, and economic vitality. | \$96.4 M |
| The U.S. economy is increasingly dependent on coastal resources. One in every six jobs is marine related and one-third of the Nation's gross domestic product is produced in coastal areas through tourism, recreation, and other industries. These industries depend on healthy coastal resources to survive. Effective planning and revitalization of coastal communities is essential to sustainable management of both natural areas and the coastal communities that depend on them. | Foster well-planned and revitalized coastal communities that sustain coastal economies, are compatible with the natural environment, minimize the risks from nature's hazards, and provide access to coastal resources for public use and enjoyment. | \$176.4 M |

Resource Requirements

Total Dollars: \$486.8 million

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| \$261.0 M | \$278.7 M | \$486.8 M |

Performance Goal 7: Sustain Healthy Coasts

Resource Requirements (cont.)

Total FTE: 912

Skill Requirements: *Marine Ecologists, Fisheries Biologists, Environmental Educators, Land Use Planners, Toxicologists, Chemists, Engineers, Oceanographers, economists.*

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| 890 | 867 | 912 |

Total IT Dollars: N/A

IT Requirements: *Sustaining healthy coasts does not rely on any one major IT system*

| FY 99 Actual | FY 00 Enacted | FY 01 Request |
|--------------|---------------|---------------|
| N/A | N/A | N/A |

Cross-Cutting Activities

Other Government Agencies

NOAA has leveraged its resources through a variety of effective international, interagency, State, local, private-sector, and other partnerships to develop world-class coastal stewardship capabilities. These partnerships are essential to effectively integrate coastal science, assessment, monitoring, education, and management activities.

In FY 2001, for example, SHC will work with other Federal agencies, States, and academic partners to initiate new research necessary to sustainably manage the Nation's coastal ecosystems. This research will provide managers and decision-makers with information, solutions, and technologies as part of interagency initiatives developed by the National Science and Technology Council's Committee on Environment and Natural Resources.

Through SHC, NOAA provides technical and scientific assistance to a variety of partners involved in protection, monitoring, and restoration of coastal resources. For example, NOAA provides critical information to the U.S. Coast Guard to help the Coast Guard respond to approximately 70 serious oil and chemical spills every year. Through SHC, NOAA is also working closely with other agencies, DOC bureaus, states, local governments, and industry on important crosscutting activities such as reducing the risks and impacts of natural hazards, protecting and restoring essential fish habitats, reducing run-off pollution, forecasting and preventing harmful algal blooms, and exploring the deep ocean and new uses of the ocean's rich biodiversity.

External Factors and Mitigation Strategies

Changes in climate, biological, and other natural conditions may affect some of NOAA's activities to sustain healthy coasts. In addition, many of these coastal stewardship activities depend on contributions from multiple partners, particularly States, territories and other Federal agencies (e.g., EPA, Interior, DOT/Coast Guard, FEMA, NSF, USDA). The failure of one or more of these partners to fulfill their cooperative contributions could have very serious impacts on the overall effort to sustain healthy coasts.

